

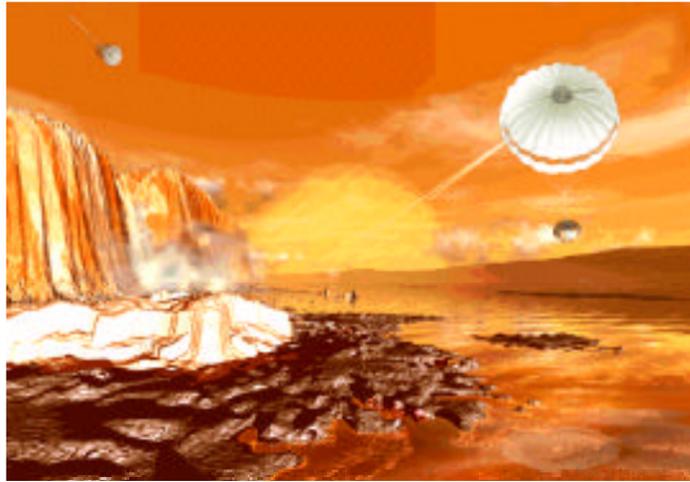
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*i b e m e*  
**S**OLAR SYSTEM

## Revised plan for Cassini, Huygens announced

By Guy Webster

*Artist's rendering shows the parachuted descent of the Huygens probe, which will now take place seven weeks later than originally planned.*



Managers for the international Cassini mission to Saturn have announced a revised plan to work around a telecommunications problem and avoid loss of scientific data after the spacecraft drops the Huygens probe to descend to the surface of Titan, Saturn's biggest moon, in 2005.

The new plan will change the originally planned date and geometry for the part of the mission in which the Huygens probe will parachute into the thick atmosphere of Titan. The new date will be Jan. 14, 2005, seven weeks later than originally planned. The plan will also position the Cassini orbiter farther away during that descent.

After six months of analysis by the European Space Agency's and NASA's joint Huygens Recovery Task Force, senior management from both agencies and members of the Cassini-Huygens scientific community have endorsed the mission modifications. The analysis was undertaken after the telecommunication problem was identified last autumn.

"This recovery plan will allow us to meet all of the mission's scientific objectives," said Bob Mitchell, Cassini program manager at JPL. "It has the additional advantage of giving us a close look at Titan before releasing Huygens."

"This recovery plan will allow us to meet all of the mission's scientific objectives. It has the additional advantage of giving us a close look at Titan before releasing Huygens."

— Bob Mitchell, Cassini program manager

When Cassini arrives at Saturn in July 2004, it will, within its first seven months there, complete three flybys of Titan instead of two as originally planned. Then, in February 2005, Cassini will resume the rest of its four-year prime mission as originally planned, studying the planet and its rings, moons and magnetic environment. The changes to the mission plan will use about one-fourth to one-third of Cassini's reserve supply of propellant. The reserve supply is carried for unforeseen needs such as this and for possible use if the mission were to be extended beyond 2008.

"In any complex space mission, problems may arise," said John Credland, head of the European Space Agency's Space Science Projects Department. "The measure of an organization is the manner in which it recovers."

Last week, European Space Agency Director of Science Dr. David Southwood and NASA Associate Administrator for Space Science Dr. Edward Weiler gave the go-ahead for Cassini and Huygens teams to implement the recommendations of the Huygens Recovery Task Force.

To ensure that the pioneering probe returns as much data as possible, the plan shortens Cassini's first two orbits around Saturn and adds an additional orbit that provides the required new geometry for Huygens' descent to Titan. Cassini's arrival date at Saturn on July 1, 2004 remains unchanged. However, its first flyby of Titan will now occur on Oct. 26, 2004, followed by another on Dec. 13. The Huygens probe will be released toward Titan on Dec. 25 for an entry into the moon's atmosphere 22 days later.



Shrouded in an orange haze, Titan is one of the most mysterious objects in our solar system. It is the second largest moon (after Jupiter's Ganymede) and the only one with a thick atmosphere. The atmosphere excites scientific interest, since it may resemble that of a very young Earth.

To reduce the Doppler shift in the signal from Huygens, Cassini will fly over Titan's cloud tops at an altitude of about 65,000 kilometers (40,000 miles), more than 50 times higher than formerly planned. The new plan also calls for several modifications to ensure maximum efficiency of the Huygens communications system. These include pre-heating the probe to improve tuning of the transmitted signal, continuous commanding

by the orbiter to get the best possible performance by the receiver, and changes in the probe's on-board software.

"I am very happy that we have found a good engineering solution," said Kai Clausen, the European Space Agency's integral project manager and co-chairman of the task force. "But a lot more work still needs to be done. Now we need to complete the detailed design, implementation, validation and testing over the next few years."

"There are still some small uncertainties, for example the exact definition of the landing site, but these are minor problems," said Dr. Jean-Pierre Lebreton, ESA's Huygens project scientist.

The Cassini-Huygens mission was launched in 1997. Engineers last year identified a design flaw in the Huygens communication system. Without a change in flight plans, the Huygens receiver would be unable to compensate enough for the Doppler shift in radio frequency between the signal emitted by the probe and the one received by the orbiter. A Doppler shift happens when the distance between a transmitter and receiver is changing, and Cassini originally would have been rapidly approaching Titan during Huygens' descent. This would have resulted in the loss of important data from the probe during its trip through Titan's atmosphere.

*i b e m e*  
**S**TARS AND GALAXIES

## Galex continues environmental tests

*The Galaxy Evolution Explorer as shown undergoing vibration tests at JPL in June.*



The JPL-developed Galaxy Evolution Explorer, a telescope that will map the history of star formation in the universe, going 80 percent of the way back to the Big Bang, continues environmental testing in preparation for its launch next spring.

Random vibration testing of the instrument (which contains the telescope) was completed last week at JPL. "We modified the primary structural support of the instrument by softening the three support bipods that attach to the

spacecraft bus," said Project Manager Dr. Jim Fanson. "This was done in order to alter the structural dynamic properties of the instrument and reduce the telescope vibration response level, which we deemed to be too high from earlier testing."

Previously, optical and thermal-vacuum tests were conducted.

Fanson said the plan is to deliver the instrument to Orbital Sciences Corp. in Germantown, Md. for integration with the spacecraft bus on Sept. 1. "After that we will

perform a series of satellite level environmental tests," he said.

Galaxy Evolution Explorer will survey the sky using the ultraviolet part of the light spectrum, and will observe hundreds of thousands of galaxies. "We think the universe is about 13 billion years old, so we'll be studying galaxies and stars across about 10 billion years of cosmic history," Fanson said. "Our goal is to determine how far away each galaxy is from us and how fast stars are forming in each galaxy."

## News Briefs



Larry Dumas



Ed Caro

### Dumas, Caro get NASA's highest honor

JPL Deputy Director LARRY DUMAS, and ED CARO, chief engineer for the Shuttle Radar Topography Mission (SRTM), have been awarded NASA's Distinguished Service Medal.

The June 21 ceremony at NASA Headquarters cited Dumas for his distinguished leadership and significant management contributions to the success of the Lab's robotic exploration of the solar system.

Caro received the award for distinguished service throughout his career in furthering the NASA mission through extraordinary engineering contributions and interpersonal effectiveness. He was the chief engineer on almost all NASA space radar missions, and the intellectual inventor of the SRTM. Caro retired from JPL in September 2000, after 42 years of service.

JPL's recently retired director, DR. ED STONE, was also given the Distinguished Service Medal, although a scheduling conflict prevented him from attending the awards ceremony.

The medal—the highest honor that NASA confers—is awarded to any person in federal service who, by distinguished service, ability, or courage, has personally made a contribution representing substantial progress to the NASA mission in the interests of the United States. The contribution must be so extraordinary that the other forms of recognition by NASA would be inadequate.

### Maleki garners IEEE honor

Senior Research Scientist DR. LUTE MALEKI, technical group supervisor of the Quantum Sciences and Technology Group, has been honored by the Institute of Electrical and Electronics Engineers (IEEE) "for outstanding contributions and scientific leadership in the development of a wide range of atomic clocks and oscillators supporting the U.S. space program."

Maleki received the I.I. Rabi award at the IEEE's International Frequency Control Symposium. The award recognizes outstanding contributions related to the fields of atomic and molecular frequency standards, and time transfer and dissemination.

Maleki has been at JPL since 1979. His group's areas of research include the development of atomic frequency standards and atomic sensors; cryogenic oscillators; photonics frequency generation and distribution systems; and investigations of the noise and stability properties of radio frequency and optical frequency sources.

### Miller receives AIAA award

JAMES MILLER of the Navigation and Mission Design Section 312 has received the 2001 Mechanics and

Control of Flight Award from the American Institute of Aeronautics and Astronautics (AIAA) for his "contributions to astrodynamics and space exploration, particularly for being the technical innovator of the navigation system used to implement the first asteroid orbiter."

Miller was lead technical engineer for navigation of the Near Earth Asteroid Rendezvous (NEAR) mission, completed earlier this year. His other work experience at JPL includes guidance and control analysis on the Mariner Mars 1969 mission, control and trajectory optimization for the Viking mission, navigation analysis and system design for the Galileo mission and proposed Comet Rendezvous Asteroid Flyby mission.

He graduated from Carnegie Mellon University in 1961 with a bachelor's degree in electrical engineering.

### Trosper gets scholar-athlete honor

JPL engineer JENNIFER HARRIS TROSPER has been inducted into the Verizon Academic All-America Hall of Fame in New York City.

The Hall of Fame honors former college scholar-athletes who have excelled in their professions and have made substantial contributions to their communities.

Trosper is the project systems engineer for JPL's Mars Exploration Rover mission, which in 2003 will send two rovers to Mars to search for evidence of liquid water that may have been present in the planet's past.

At JPL since 1990, Trosper is a graduate of the Massachusetts Institute of Technology, where she lettered in volleyball all four years.

### IT symposium proves a success

In-situ mission simulation, nanoscale electronic devices, scientific animation techniques and the InterPlanetary Network were among the topics presented at JPL's first Information Technology Symposium, held on May 9.

Sponsored by Institutional Computing and Information Systems and the Center for Space Missions Information and Software Systems (CSMISS), the event showcased the accomplishments and capabilities of the Lab's information Technology community. Sixty-five papers and 20 posters were presented. Approximately 300 people attended.

Among the keynote talks were those by GAEL SQUIBB, director for InterPlanetary Network and Information Systems; TOM RENFROW, Chief Information Officer; DR. WILLIAM WEBER, director For Engineering and Science; and DR. RICHARD DOYLE, leader of CSMISS and the Division 36 manager. Presentation abstracts, slides and videos are online at [http://icis.jpl.nasa.gov/IT\\_Symposium/index.html](http://icis.jpl.nasa.gov/IT_Symposium/index.html).

## Special Events Calendar

### Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

End of Life Issues and Bereavement—Meets the second Monday of the month at noon. For location, call the Employee Assistance Program at ext. 4-3680.

Gay, Lesbian and Bisexual Support Group—Meets the first and third Fridays of the month at noon in Building 125-133. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Parent Support Group—No meetings are scheduled for July; next meeting is Aug. 16. For location, call the Employee Assistance Program at ext. 4-3680.

Senior Caregivers Support Group—No meetings are scheduled for July or August; next meeting is Sept. 6. For time and location, call the Employee Assistance Program at ext. 4-3680.

### Tuesday, July 10

JPL Genealogy Club—Noted speaker and author Barbara Renick will present a program on the most useful sites and online tools for family history research at this special meeting date, at noon in Building 301-271.

JPL Stamp Club—Meeting at noon in Building 183-328.

### Wednesday, July 11

Associated Retirees of JPL/Caltech Board—Meeting at 10 a.m. at the Caltech Credit Union, 528 Foothill Blvd., La Cañada.

JPL Amateur Radio Club—Meeting at noon in Building 238-543.

JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Jim Raney at ext. 4-6301.

### Thursday, July 12

JPL Stories—DJ Byrne of Section 366 will present "Shadow Systems: Collaboration Strikes Back" at 4 p.m. in the Library, west end of Building 111. He will lead a story circle, where people who have built or benefited from shadow systems are invited to share their tales about how they

changed the Lab when no one was looking—when innovation from the trenches took JPL's culture off the established path to create workable solutions.

### Tuesday, July 17

Investment Advice—TIAA/CREF will hold individual counseling sessions from 9 a.m. to 3 p.m. in T-1720. For an appointment, call (877) 209-3140, ext. 2614, or log on to [www.tiaa-cref.org](http://www.tiaa-cref.org).

JPL Hiking+ Club—Meeting at noon in Building 238-543.

TIAA/CREF Enrollment Meeting—For employees newly eligible to participate in the retirement plan. Investment options and assistance in the completion of the enrollment forms will be available. To be held from noon to 1 p.m. in Building 180-101.

TIAA-CREF Investment Workshop—Scott Budde, director of CREF investments, will present "Ignoring the Noise: An Analysis of Stock and Fund Returns" from 10 to 11:30 a.m. in von Kármán Auditorium. Topics will include Dual Investment Management Strategy (active vs. index management), short-term vs. long-term perspective on risk and return in equity markets, causes of volatility in the market, how to approach equity investing, and qualities to look for in an investment management company.

### Wednesday, July 18

Investment Advice—Fidelity and TIAA/CREF will hold individual counseling sessions from 9 a.m. to 3 p.m. in T-1720. For an appointment with Fidelity, call (800) 642-7131. For TIAA/CREF, call (877) 209-3140, ext. 2614, or log on to [www.tiaa-cref.org](http://www.tiaa-cref.org).

### Thursday, July 19

Von Kármán Lecture Series—"Mars Exploration: From the Vikings to the 21st Century" will be presented by Dr. John Callas, Mars Exploration Rover Science Office manager, at 7 p.m. in von Kármán Auditorium. Open to the public.

### Friday, July 20

Von Kármán Lecture Series—"Mars Exploration: From the Vikings to the 21st Century" will be presented by Dr. John Callas, Mars Exploration Rover Science Office manager, at 7 p.m. in The Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

## WFPC2 images baffle scientists

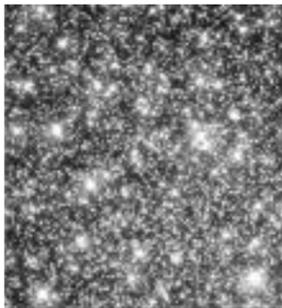


Photo: Space Telescope Science Institute

The Wide Field Planetary Camera 2 imaged these bodies in the globular cluster M22 by the way their gravity bends the light from background stars, a phenomenon called microlensing.

Scientists are mystified by what may be unexpected, wandering, planet-sized objects.

A new image taken by the Wide Field and Planetary Camera 2 (WFPC2) aboard NASA's Hubble Space Telescope implies the presence of these objects. The image is available at <http://oposite.stsci.edu/pubinfo/latest.html> and <http://www.jpl.nasa.gov/images/wfpc>.

The camera was designed and built by JPL. If confirmed, the new information could yield new insights about how stars and planets formed.

In results published in June in the journal Nature, the scientists report six unusual "microlensing" events inside the globular cluster M22. Microlensing occurs when a background star brightens momentarily as a foreground object drifts by. The gravitational field of the object amplifies light from a distant background star in the huge central bulge of our galaxy. The objects believed to cause these events are too dim to be seen directly.

The unusually short period (less than 20 hours) over which these microlensing events occurred indicates that the mass of the intervening objects could be as little as 80 times that of Earth. If confirmed, these bodies would be the smallest celestial objects ever seen beyond our solar system that are not orbiting any star.

Theoretically, these objects might be planets that were gravitationally torn away from parent stars in the cluster. However, they are estimated to make up as much as 10 percent of the cluster's mass—too numerous to be wandering, "orphaned" planets.

Because these findings are so surprising, the astronomers caution that they must be confirmed by follow-up Hubble observations.

"Scientifically, this Hubble result is one of many indirect measurements suggesting that planets are lurking out there in the galaxy," noted Dr. Karl Stapelfeldt of Division 32, an astronomer on the WFPC2 Science Team. "This is the first result suggesting that planets can be found in association with stars much older than the Sun. In this case the planets would have to be 'free floating,' meaning they have been stripped away from their parent stars and follow their own independent paths within the star cluster.

"Results like these continue to build the case for obtaining direct images of extrasolar planets," Stapelfeldt said. "No current telescope is capable of imaging planets like ours circling other stars, but NASA's Origins program is working to make this possible in the not-too-distant future."

"These results are early indications that there are sure to be more surprises as we begin to study nearby planetary systems in greater detail," added Dr. John Trauger, WFPC 2 principal investigator. "The recent result in M22 suggests we need to revise our understanding of planet formation.

"The Hubble Space Telescope was not designed for direct detection of planets," Trauger said. "Instead, this will be accomplished by a new generation of space telescopes that build upon our experiences with Hubble, possibly within this decade. And JPL will likely be in the forefront of these new planet-finding missions, both in

terms of Terrestrial Planet Finder and possible precursor missions."

The new Hubble image includes an inset photo showing the entire globular cluster of about 10 million stars. Globular cluster M22 is about 60 light-years wide. A light-year equals about 9.5 trillion kilometers (5.9 trillion miles). The image was taken in June 1995 by the Burrell Schmidt telescope at the Case Western Reserve University's Warner and Swasey Observatory on Kitt Peak in Arizona.

Additional information about the Hubble Space Telescope is online at <http://www.stsci.edu>. More information about WFPC2 is at <http://wfpc2.jpl.nasa.gov>.

The Space Telescope Science Institute in Baltimore manages space operations for the Hubble Space Telescope for NASA's Office of Space Science.

## Correction

A News Briefs article in the June 8 issue of Universe highlighted winners of NASA's 2001 George M. Low Award for Quality and Technical Performance. The article failed to include that Swales Aerospace of Beltsville, Md., was this year's winner in the small business-product category. Swales has supported numerous JPL missions and projects through its Pasadena office since 1997. The company currently has a contract with JPL with a maximum value of \$34 million.

# YOUTHFUL EXUBERANCE

By Derek Blackway

After breezing through high school, 18-year-old couldn't wait to explore space

When phoning JPL summer intern Aubrey Watson at her office, it was not surprising to hear the voice recording announcing that she was busy on the other line.

Between graduating high school a year early, finishing her freshman year at Arizona State University and interning at JPL under Mars Odyssey support, Watson has had her hands full – and she just turned 18.

Transferring from a high school in Idaho as a sophomore, Watson finished her senior year at Corona del Sol High School in Tempe, Ariz., when she was 16 years old, all the while aiming to become an astronaut.

"High school was not challenging enough," said Watson. "I was bored."

Beginning in elementary school and continuing through high school, she immersed herself into space exploration. She got involved in projects ranging from the Mars In-Situ Propellant Experiment curriculum to acting as a laboratory assistant for Dr. Laurie Leshin, an associate professor of geological sciences at ASU.

It was when working with Leshin that Watson decided to graduate early.

As a result of her experience working at JPL, Watson is considering double-majoring in aerospace along with geology.

Watson's interest in space is steadfast, and has been ever since she was 11 years old.

"If I'm not doing something involved in space, I lose interest," she said.

While in the sixth grade, Watson's passion for space was ignited by two factors: ice skating and the movie "Apollo 13".

She was impressed by the dedication the ice skaters displayed by starting their profession at such a young age, and resolved that beginning a career at an early age was the smartest decision she could make. She was an 11-year-old girl who felt like she was wasting time by not getting started in

a career of her own. "I wanted to start working towards something substantial," Watson said. Shortly thereafter, she found her inspiration for her interest in space after watching "Apollo 13." The rest is history, or would future be a better word?

It was difficult for Watson to get involved with space programs at such a young age. "I've always been the youngest one," she said. "No one would really take me seriously when I told them my career goals."

Although battling against her younger age, Watson's encouragement to face her fears derives from her mother's continuing support.

Watson's mom, Sheri Klug, a Mars outreach coordinator at ASU for grades K-12, emboldens Watson to "get over it," whenever it would be easy for her fears to get the best of her.

With that strong support behind her, it is evident that "determination is no problem for me," Watson said. "The only thing stopping you is your mind."

As for her experience at JPL, "There is a team atmosphere here. I love it. I can learn so much from the people with whom I am working. It's an amazing place."

Until she graduates, Watson will delve into as many aspects of the Mars Exploration Program as possible. Her plan is to be able to understand the different components of a mission regardless of which field she decides to keep as her career. However, the main theme resonating in anything she does is the desire to never get bored.

"I want always to be doing something that makes me say, 'Wow.'"

Photo of Aubrey Watson by Dutch Slager / JPL Photo Lab

"Aubrey focuses like a laser beam when she targets her goal. She has made a wonderful contribution to our group and she reminds me of why I'm teaching."

— Dr. Laurie Leshin, Arizona State University professor

"Dr. Leshin was the first one who exposed me to the research environment," Watson said. She enjoyed working with Leshin and resolved to attend ASU after she finished high school.

"Aubrey focuses like a laser beam when she targets her goal," Leshin said. "She has made a wonderful contribution to our group and she reminds me of why I'm teaching."

Dissatisfied with the slow pace of high school, added with her vehement desire to propel into space science, she went to her counselors seeking early graduation advice. It turned out that she was already on her way to being eligible to graduate early. She completed the necessary classes and graduated the day after she turned 17.

Her goals were set early. But how she was going to reach them had yet to be revealed. She was going into ASU as a freshman, but did not know what she wanted for a major. She decided to give geology a try, because "it made sense." After completing an honors geology course with Leshin at ASU, she realized that she loves the subject and will stay with it as her major. Her minor will be in astronomy.

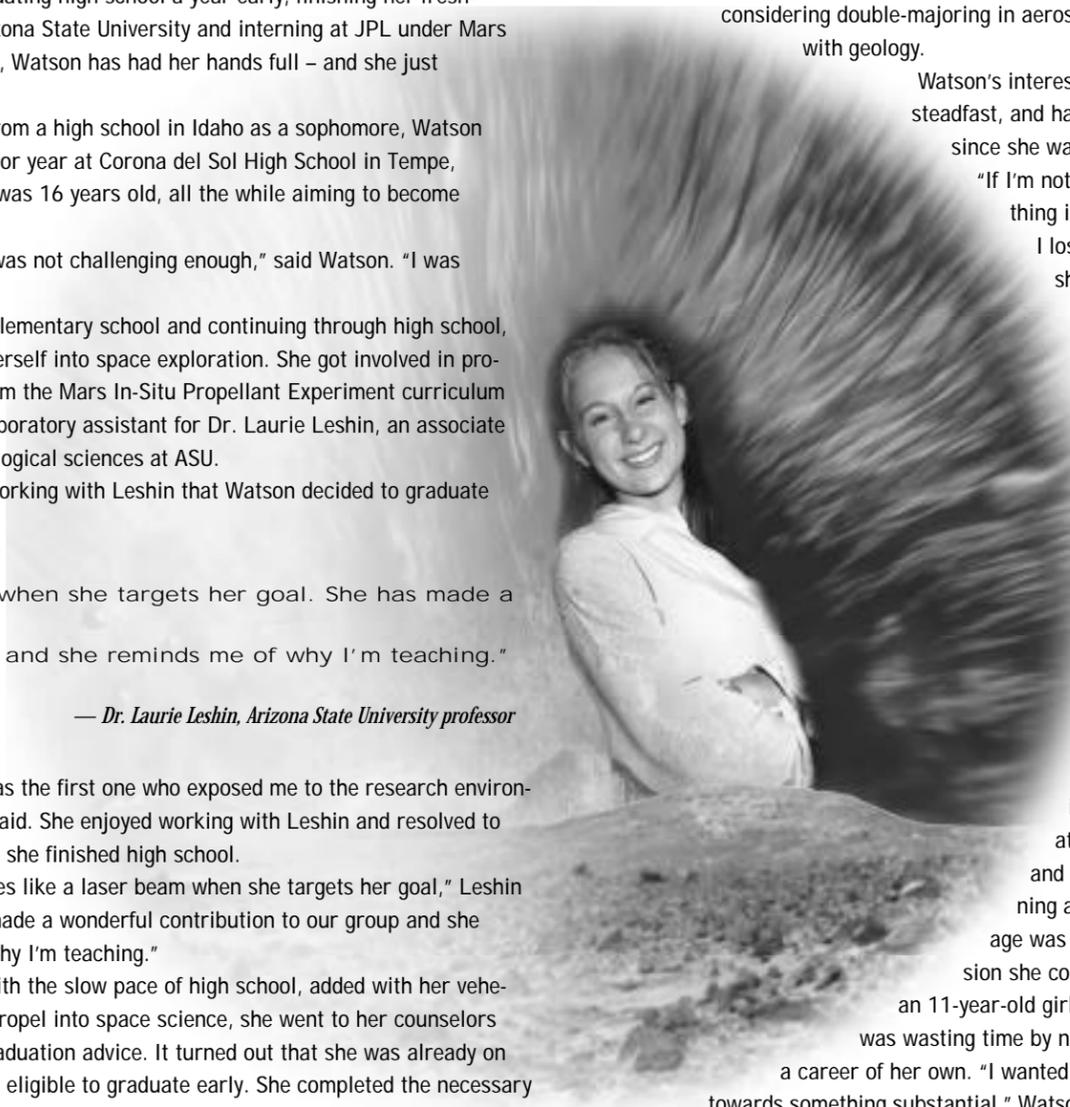
She had always wanted to go to other planets, but upon her exploration of geology, she now looks at Earth in a different light. She finds it fascinating to be able to identify Earth's geological features and piece together the past of a given area based on its natural composition. Geology further fueled her passion for learning about planetary composition.

At a chance meeting while attending ASU, Watson met JPL's David A. Spencer, mission manager for 2001 Mars Odyssey. Upon learning of Watson's desire to become an astronaut, Spencer and Watson maintained correspondence over the months. When summer came around, she was offered the internship.

Now, here at JPL, she's working with Mars Odyssey mission operations and just started 2003 Mars landing-site support, dealing with landing ellipses and Mars Orbiter camera data.

Working part time under Mars Program Landing Site Project Scientist Dr. Matt Golombek, Watson is plotting Mars Orbiter camera high-resolution images on potential landing ellipses for the Mars Exploration Rovers.

"Aubrey has a good feel for the software," Golombek said.



# Native American educators go back to school

By Carolina Martinez

*In an exercise to teach students how constellations are named, teachers worked inside a plastic "planetarium" at JPL's Educator Resource Center, where they poked small holes in the structure to create stars.*

A group of 17 elementary and secondary school teachers from Native American reservations learned about some of JPL's most exciting missions during a two-week educational workshop ending June 22. Teachers from four different school districts—three in New Mexico and one in Arizona—learned how to involve their students in the wonders of space exploration while preserving and celebrating their rich Native American traditions.

The workshop at the JPL Educator Resource Center in Pomona brought together two different worlds that view the stars differently. For one, the stars are a source of spiritual guidance, and for the other they are a means to learn more about age-old questions such as

"Where did we come from?" and "Are we alone?"

"Our role is to help teachers come up with a plan that they can take back to their classroom," said Gene Vosicky, the center's administrator. "Together, we work to answer questions and figure out ways to incorporate space science and technology into their curriculum."

The primary goal of the workshop was to develop an action plan that supports standards-based teaching and learning in mathematics, science, technology and geography. Scientists, educators and engineers from JPL served as guest speakers. Tours of a botanical garden, an observatory and NASA Dryden Flight Research Center were also part of the workshop.



Bob Brown/JPL Photo Lab

## Retirees

The following employees retired in July:

Tin Dao, 26 years, Section 331; Alice Fairhurst, 10 years, Section 197; David Farless, 34 years, Section 312; Jay Lieske, 34 years, Section 312.

## Passings

**RICHARD ABRAHAMSON**, 75, a retired contract administrator in Section 622, died of Alzheimer's disease June 6 at a convalescent hospital.

Abrahamson joined JPL in 1967 and retired in 1989. He is survived by four children, five grandchildren and one great grandchild.

Burial was at Sunset Hills Memorial Park in Apple Valley.

**ELMER HASTINGS**, 72, a retired printing supervisor in Section 642, died of cancer June 8.

Hastings worked at the Lab from 1965-92. He is survived by five children and 14 grandchildren.

Memorial services were held June 14.

**E. LORRAINE BRAKEBILL**, 80, a former executive secretary in the Director's Office who retired in 1992, died of cancer June 10.

Services were private.

**PAUL BROER**, 60, a former software engineer in Section 345, died of brain cancer June 12.

Broer's work included testing flight sequences for Galileo operations as well as re-programming duties to help repair the spacecraft's antenna. He left JPL in 1999.

Services were held June 30 at Throop Unitarian Universalist Church in Pasadena.

**SONIA KHATRI**, 36, a communications engineer in Section 366, died of cancer June 14 at her home in Canyon Country.

Khatri had worked at JPL since 1989. She is survived by her son, Viraj, and her parents.

Services were held June 18 at Crawford Mortuary in Northridge.

**ELAINE EVANS**, 65, an administrator in Section 220 who had been on long-term disability, died of cancer June 23 at her home in Glendora.

Evans joined the Lab in 1979. She is survived by her husband, Robert; nine children, 14 grandchildren and 1 great grandchild.

Burial was at Oak Dale Mortuary in Glendale.

**JAMES BLAIN**, 62, a retired member of the information systems staff in Section 311, died of cancer June 24.

Blain worked at JPL from 1986-98. He is survived by sons James and Enrique, daughter Maria, and three grandchildren.

Services were private.

**JOHN O'KANE**, 72, a retired maintenance electrician in Section 662, died of heart failure June 25.

O'Kane joined the Lab in 1967 and retired in 1992. He is survived by sisters Mary and Isabel O'Kane, and Kathleen O'Hagan.

Burial was at Calvary Cemetery in Santa Barbara.

## Letters

My wife and I extend our thanks to the ERC for the beautiful flowers sent following the death of my father. We also thank my friends and colleagues in Section 344 and elsewhere in the JPL family for their many expressions of sympathy and support.

John and Greta Davidson

Thank you, colleagues and ERC, for the lovely plant you sent after my brother's passing.

Jay Braun and family

## Classifieds

### For Sale

**AIRLINE TICKET**, round trip, anywhere Southwest flies, must complete travel by Aug. 12, 2001, \$300. 626/355-3886, Rosemar y.

**AUDIO COMPONENTS**: ADC Soundshaper 90 stereo equalizer; Onkyo P-3300 wireless remote preamp; Onkyo M-5300 stereo pwr. amp (150 watts/8 ohms); Onkyo T-4000 quartz synthesized stereo tuner; Pioneer CLD-1070 Laser Disc player, best offer. 626/791-7928, Michael.

**BEDROOM SET**, girl's, charming, including headboard, twin bed w/practically new matr. canopy, dresser, mirror nightstand + access., all matching, \$600. 626/791-1581.

**BIKE**, road, specialized, 1991 Allez, lg. carbon fiber frame, Suntour 12-speed shifters, very light & stiff, both triathlon & standard drop bars, look pedals, \$300 firm. 626/794-0886, Ted.

**BIKE**, mountain, 21 spd., Shimano equipped, 24" frame, nearly new, used little, cost \$135 new, must sacrifice, \$80/obo. 661/297-0219.

**BOOTS**, hiking, Vasque Clarion, new, ladies size 7, orig. \$150, sell for \$75. 626/798-6248.

**BUNK BED**, solid pine, \$150. 248-2931.

**CAMERA**, Nikon N70 (body only), orig. box & owner's manual, extra battry., \$225. 989-1388.

**CAR SEATS**, 2 Evenflo infant seats, luggage style handles, Looney Tunes characters, exc. cond., \$28/ea. 626/443-9774, Eve.

**COFFEE**, top of the line 100% pure Kona, hand-picked from top-quality trees, 100% sun dried, rich, dark roast, ltd. supply, discounted 45% at introductory price of \$21/lb. 626/584-9632.

**COFFEE TABLE**, with 6 sectional tables, oval, black, table-top recalls, garden scene with 5 lady figurines with their musical instruments, handcrafted in mother-of-pearl, around a hand-painted Chinese pagoda, rim and sides are handpainted with gold details, 50" x 30" x 20", comes with 3/8" glass to protect the delicate figurines, \$150/obo. 626/683-0706.

**COMPUTER**, Apple iBook, blueberry, 300MHz, 96MB, SDRAM, 3.2G HD, 24 x CD, 56K modem, exc. cond., graphite-colored case, \$850. 249-0183, eves.

**COMPUTER**, Mac Power PC 6400, 180 MHz, monitor & printer, \$200/obo. 626/798-0329.

**COMPUTER DESK**, 6 months old, exc. cond., burnt sienna wood color veneer, on wheels, keyboard tray, lots of storage, must sell, \$50. 626/798-5222.

**COMPUTER MONITOR**, color, 21", Avitron AV-21TF, purchase price \$1,000, two months old, sell for \$400. 790-3854, Carol.

**KITCHEN CABINET** with stainless steel sink, chrome faucet and spray, white formica cabinet with 3 doors and 1 drawer, 39" H x 52" W x 26" D, \$65. 626/798-0329.

**MISC**: dining set, Italian marble, w/6 chairs \$1,800; grandfather clock, antique, needs minor repair, \$800. 626/441-0150.

**PIANO**, Login & Co, 1920s era upright, gd. for beginners, pd. \$1,385, make offer. 951-8888.

**PRINTING CARTRIDGES**, 2, new, Brother PC-201, for use with fax 1010/1020/1030, fax 1170/1270/1570MC, MFC-1770/1970, \$10 each. 626/443-9774.

**SAW**, Craftsman, 10" radial arm, on movable stand, little use, gd. cond., \$225. 352-0075.

**SAW**, Skilsaw table saw, 10 inch, new \$100; ROUTER, Black & Decker, 11 amp, new, \$130; FUTON, \$50; LOVESEAT, \$70; MATTRESS SET, Cal-king, pillow-top, \$500; BED, Cal-King, pine 4 poster, \$400. 626/797-6737.

**SLEEPING BAG**, A16 mummy, blue, 4 season, \$25. 989-1388.

**STORAGE BUILDINGS**, (2) 8' x 16', wood frame, sliding, portable, \$4,000 new, \$995/ea. 562/699-8687.

**TABLE** dinette, square glass top, 5' x 5', w/metal feet and 4 matching chairs, \$700/obo; BAR STOOLS, four matching, metal frame, all in superb condition, \$300/obo. 626/398-3480.

**TELESCOPE**, Meade 10-inch Schmidt-

Cassegrain, model 2120, quartz optics, bought in 1988, good cond., declination motor and focus motor included, \$800/obo. 626/798-8369.

**WEDDING GOWN**, Mori Lee designer, scalloped neckline, short capped sleeve, satin bodice overlaid with lace and re-embroidered appliques, trimmed with sequins, pearls, deep V-back meets satin bow at waist, no train, http://www.morileeinc.com/catalog/C2001S5pix1.html for picture, purchased late 2000, worn once, clean, size 12, fits 5' 8", \$199/obo; ACCESSORIES, matching head crown piece, three-tier veil, petticoat, \$90. 241-3779.

**WEDDING GOWN**, Moonlight designer, shown in Bride's Magazine, beautiful off-the-shoulder gown, Basque waist, illusion fitted point, stain/organza & Alencon lace, Cathedral train, pearl & sequin beading, http://www.moonlight-bridal.com/asps/gowndetail.asp?gno=JW3004 for picture, purchased late 2000, worn once, clean, size 14, fits 5' 8" or shorter, \$199/obo; ACCESSORIES, matching head crown piece, 3-tier veil and petticoat, \$90. 241-3779.

### Vehicles/Accessories

'83 BUICK Regal, V6, auto, nice, only 68,000 miles, \$2,000. 848-2922.

'99 FORD Mustang, 27K mi., automatic, like new, \$12,500/obo. 310/556-2723.

'97 FORD F150 XLT Supercab, 4.8 L, V8, white, auto, a/c, power locks/windows/steering, cruise control, towing package, bed liner, exc. cond., 48K mi., \$13,500/obo. 626/429-3830.

'96 FORD Explorer XLT, only 48K mi., "cream puff" leather, exc. cond., all pwr., windows, door locks/seats, cruise control, roof rack, front/rear a/c, alloy whls, 6 cyl., white, loaded, \$14,500/obo. 310/451-5919.

'94 FORD Explorer Sport, 5 spd., 4 w/d, 96K mi., black, gray leather, all power, 10-disk CD, alarm, alloy wheels, 5 new tires, \$7,000/obo. 323/655-5864.

'91 FORD T-Bird, V8, 34,800 mi., new front brakes, tires & battery, interior and exterior vg cond., drive to appreciate, \$4,000. 951-3467.

'85 FORD Bronco II XLS, 4 x 4, 2 dr., 5 spd., recently rebuilt 2.8L V6, new exhaust & catalytic converter at time of rebuild, rebuilt carb, brand new tires & spare, reg'ed & smogged til Jan '02, must sell, \$1,850/obo. 626/791-7219, 7-10 p.m., Khee or kheechean@earthlink.net.

'67 FORD Mustang, 390, 4 spd., S code, new paint & interior, orig. LA model, 80% restored, runs great, \$9,000/obo. 626/339-9353, Greg.

'89 MAZDA MX-6, red, good cond., 134K mi., \$2,500. 540-1008.

'93 PLYMOUTH Voyager mini-van, blue, new transmission, new tires, new brakes, 94K miles, \$4,500/obo. 626/857-1854, eves.

'92 SATURN coupe, exc. cond., 68K mi., moving to Hawaii, must sell, \$4,500/obo. 790-6261.

'88 SEA RAY boat, 23'uddy cabin, 185 orig. hrs., 5.7 liter motor, mercruiser outdrive, new upholstery, ship to shore radio, live bait tank, \$11,000/obo. 626/339-9353, Greg.

'00 TOYOTA Corolla CE, mint cond, 4 dr., auto, a/c, pwr/w windows/locks, cassette, grn. w/gray interior, 14K mi., \$11,900/obo. 310/915-5991.

'93 TOYOTA Camry LE, dark green, 112K mi., fully automatic, a/c, exc. cond., \$5,700/obo. 626/294-0049, eves.

'90 TOYOTA 4Runner SR5, 4 X 4, V6, auto, pwr. windows, door locks, sunroof/moonroof, tilt wheel, a/c, am/fm stereo/cass., CD, running boards, roof rack, 117K mi., gold w/tan interior, runs great, very clean, \$6,500. 626/852-0589.

'88 TOYOTA 4Runner SR5, V6, a/c, p/w, PIAAs on grill/guard, runs great, 152K mi., am/fm w/ cassette, flip up sunroof, \$5,900. 626/791-0075.

### Wanted

**ANTIQUEN LINENS**, white on white, hand-embroidered, preferably monogrammed (any monogram), must be in exc. cond. 980-1638.

**SPACE INFORMATION/memorabilia** from U.S. & other countries, past & present. 790-8523, Marc Rayman.

**TO RENT** condo or house: French engineer + spouse and 2 children at JPL for 1 year, starting in Aug., furn. or not. 561 27 47 85 (France) or philippe.crebassol@cnes.fr.

**VANPOOL RIDERS** from Little Rock/Palmdale to JPL/Caltech. Ext. 3-3790 or 661/944-2448.

### Free

**PATIO BLOCKS**, 100. 626/445-2616, Shari.

### For Rent

**ALTADENA** house, 1 bd., 1 ba., large front yard, on cul de sac; water, garbage and gardener included, \$800. 626/798-3640.

**ARCADIA**, lg. studio, detached, separate entry, furn., kitchen, laundry facilities, no pets, non-smokers, shared utilities, \$850. 626/441/0041.

**EAST PASADENA**, charming house, 2 bd., 2 ba., 2 extra rms. for office use, hardwood flrs., f/p, 2-car gar., Indry, 3 window air conditioners, \$1,200. 626/794-3906.

**LA CANADA** guest house, 2 bd., 1 ba., close to school, \$950. 952-8638, after 6 p.m., Susan.

**LAS VEGAS**, Desert Shores, 7613 Sea Cliff Way, 1 story, 2 bd., 2 ba., unfurnished house, gard/appls incl, 1 yr. lease, no pets, \$1,000 + dep. 661/254-6134.

**PASADENA**, nice townhouse, btwn. Old Town & Caltech, 2 level, 2 bd., 2.5 ba., washer/dryer in unit, f/p, cent. a/c, storage, hardwood flrs., 2-car carport, patio, approx. 1,300 sq. ft., from 8/1, \$1,600. 626/792-1709, Robert or Laryssa.

**PASADENA**, charming 2 story English, 3 bd., 2 ba., l/r, formal d/r, cozy f/p, laundry rm., large backyard, pool, patio, built-in-BBQ, wood deck, nice landscape, avail. from 8/01, \$1,350, includes pool & gardener. 626/574-7027, eve.

**PASADENA**, nice home for lease, near Caltech, 3 bd., 2 ba., service porch with wash/dry hook-ups, nice front & back yd., flowers & fruit trees, avail. Aug. 1, \$1,200 + security deposit. 626/794-0455.

**PASADENA** apt., nr. PCC, 2 bd., + den, 2.5 ba., townhouse style, blt.-in range & oven, refrig., disposal, crpts., drapes/blinds, a/c, 2 fireplaces, cvrd. parking, laundry, \$995. 790-7062.

**PASADENA**, room in a 4-bd., 2-ba. apt., furnished, parking space, close to Caltech & PCC, \$495 + util. 626/351-9641.

**SOUTH PASADENA**, fully furn. studio apt, 1718 Huntington Dr. betw. Marengo & Milan Sts., car space, laundry, utilities paid, no pets, non-smoker, \$750. 626/792-9053, Ray or Marilyn.

### Real Estate

**ALTADENA** condo, minutes from JPL, 2 bd., 1.75 ba., nice closets with organizers, f/p, cent. a/c, community pool, storage rm., 2-car garage/carport, tile counter top and marble floor in kitch., lg. patio with landscape, planters & oriental garden w/waterfall and spa, end unit with windows on 3 sides, sale by owner, \$154,000. 626/398-1988, Beverly.

**PASADENA**, 2 bd., 1.75 ba., 1 level condo, S. Lake Ave., lg. l/r, f/p, & wet bar, formal d/r, lg. kitch. w/bfast rm., laundry area, cent. heat/air, new a/c unit, new l/r & d/r hrdwd. floors, new stove, fridge, m/wave, new paint, 1 walk-in + 3 closets, new marble entry & bath granite floors, security bldg., subterr. storage & parking, htd. pool/Jacz., \$315,000. 626/793-3561.

### Vacation Rentals

**BIG BEAR LAKEFRONT**, luxury townhome, 2 decks, tennis, pool/spa, beautiful master bd. suite, sleeps 6. 949/786-6548.

**CAMBRIA**, ocean front house, sleeps up to 4, excellent view. 248-8853.

**HAWAII**, Kona, ocean front on Keauhou Bay, house & guest house comfortably slp. 6, 3 bd., 2 ba., rustic, relaxing & beautiful, swimming, snorkeling, fishing, spectacular view, nr. restaur. golf & other attractions. 626/584-9632.

**HAWAII**, Lahaina, Maui, 1,500 sq. ft. condo on beach, 2 bd., 2 ba., sleeps 6, lanai, 2 pools and spa, tennis, restaurant, bar on site, golf nearby, avail. 2/2-2/9/02 and possibly other dates, \$1,500. 626/797-6737.

**HAWAII**, Maui condo, NW coast on beach w/ocean view, 25 ft. fr. surf, 1 bd., w/loft, compl. furn., phone, color TV, VCR, mcroww., d/w, pool, priv. lanai, slps. 4, 4/15-12/14 \$105/nt/2, 12/15-4/14 \$120/nt./2, \$10/nt. add'l person. 949/348-8047.

**LAKE TAHOE** condo, North Shore, 2 bd., 2.5 ba., slps. 6, pool, priv. beach, all amenities, convenient loc., avail. Aug., weeks only, special JPL discount. 626/355-3886, Rosemary or Ed.

**MAMMOTH**, Chamonix condo, 2 bd., 2 full ba., sleeps 6, fully equipped kitchen, incl. microwave & extras, f/p & wood, color TV, VCR, cable, FM stereo, pool & sun area, o/d Jacz., sauna, game, rec. & laundry rms., play & barbecue areas, conv. to lifts, shops, hiking, summer events, daily/wkly, rates. 249-8524.

**MAMMOTH**, Courchevel, fully equipped unit, 2 bd., 2 ba., sleeps 6, summer rates for summer activities, fishing, mountain biking, hiking. 661/255-7958.

**MAMMOTH**, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully eq'd kitch. incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. view, Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc. 626/798-9222 or 626/794-0455.

**OCEANSIDE** condo, fully furn. 2 bd., 2 ba., f/p, full kitch., quiet, relaxing, beautiful setting at beachside, w/BBQ/pool/spa/game room, great ocean view, easy walk to pier and restaurants, sleeps 6, avail. weekly or monthly. 909/981-7492 or dfhaug@yahoo.com, Jim or Darlene.

**OCEANSIDE**, on the sand, charming 1 bd. condo, panoramic view, walk to pier or harbor, pool, spa, game rm., sleeps 4. 949/786-6548.

**PACIFIC GROVE** hse, 3 bd., 2 ba., f/p, cable tv/vcr, stereo/CD, well-eqpd, kit w/microw, beaut. furn: close to golf, bchsn, 17 Mile Dr., aquar., Cannery Row. JPL discount. 626/441-3265.

**ROSARITO BEACH** condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 28 hole golf course 6 mi. away, priv. secure parking. 626/794-3906.

**VENTURA** beach cottage, 3 bd., 1 ba., slps 6-8; TV, VCR, CD player, phone, washer/dryer, backyard BBQ; short walk to beach and Marina Park. 248-0521.

**DailyPlanet**  
news for the JPL community

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